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## The experience and expression of anger and anxiety in bronchial asthma patients\*

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*This study investigated differences between asthmatic outpatients and a control group of healthy individuals in their responses to trait measures of anxiety and the experience and expression of anger. The Inventory of Situations and Responses of Anxiety (ISRA) and a Spanish adaptation of State-Trait Anger Expression Inventory (STAXI) were administered to outpatients diagnosed as suffering from bronchial asthma and healthy persons closely matched for age and gender. The asthma patients had significantly higher ISRA trait anxiety scores, and reported more thoughts of insecurity and higher levels of anxiety in interpersonal and daily life situations. The asthma patients also reported experiencing anger more frequently and without provocation than healthy persons as reflected in STAXI T-Anger, Angry Temperament, and Anger-Out scales. The results were discussed in terms of the importance of dealing with negative emotions in the treatment of bronchial asthma patients*

Keywords: Asthma, anger, anxiety.

## Experiencia y expresión de ira y ansiedad en pacientes con asma bronquial

*Este estudio investiga las diferencias entre un grupo de pacientes asmáticos y un grupo control de individuos sanos en sus respuestas a las medidas de ansiedad y de experiencia y expresión de ira. Se han utilizado el Inventario de Situaciones y Respuestas de Ansiedad (ISRA) y la adaptación española del Inventario de Expresión de Ira Estado-Rasgo (STAXI), en pacientes de consultas externas diagnosticados con asma bronquial y un grupo de personas sanas equilibrados en cuanto a género y edad. Los pacientes asmáticos han obtenido puntuaciones significativamente más altas en ansiedad*

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*estado e inseguridad, y niveles más altos de ansiedad en situaciones interpersonales y de la vida cotidiana medidos a través del ISRA. Los pacientes asmáticos también expresaron más frecuentemente experiencia de ira sin provocación que las personas sanas en las escalas de Ira-Rasgo, Temperamento-Ira y otras escalas de ira del STAXI. Se discuten los resultados en función de la importancia de las emociones negativas en el tratamiento del asma bronquial.*

Palabras clave: asma, ira, ansiedad.

## Introduction

Bronchial asthma is an obstructive and reversible lung disorder, characterized by hyper-reactivity of the respiratory tract to a variety of stimuli (Cisneros, López, Ramírez, & Almonacid, 2009). This disorder is considered the conjoint expression of a series of genetic and environmental factors that produce an inflammatory reaction, with consequent tissue dysfunction, causing the reduction of bronchial caliber and an exaggerated response to many types of stimuli (SEPAR, 2012), definition which essentially coincides with the proposal of Global Initiative for Asthma Management and Prevention (GINA, 2011).

Prevalence rates in developed countries may range between 3.6% and 5.9% (Vargas, 2009). All studies indicate a clear increase in incidence, with diagnosed cases currently twice as high as in preceding decades. This increase is not entirely due to present greater diagnostic precision (Burney, Chinn, & Roa, 1991). The increase in the amount of deaths does not coincide with that found in Spain, where a reduction in the number of deaths by asthma is noticed (Sánchez, García, Pérez, Martínez, & Sánchez, 2009).

Currently, there is a large quantity of data that accounts for, or at least clarifies, the relationship between psychological factors, physical illness, and health in general. Among the psychological factors, emotions are very important. In fact, numerous studies show that emotional factors are linked to digestive, vascular, and respiratory disorders, as well as to disorders associated with immune system failure, such as cancer, or to a great extent, bronchial asthma (Belloch, Sandin, & Ramos, 2009).

Far from the former etiological approach and following the trend of the theory of psychological psychomaintenance (Kinsman, Dirks, & Jones, 1982), researchers currently coincide in the influence of emotions and psychological factors in bronchial asthma, accepting their relevant role in maintaining the illness. This theory states that psychological, social, and behavioral variables can maintain and worsen a physical illness, always in subjects who present the disorder previously.

Among psychological factors, emotions are especially relevant to maintain the illness. Emotion is defined as any reaction that occurs in certain situations and is experienced by the individual as a strong shock to his mood or his feelings.

This experience can be agreeable or disagreeable and is accompanied by the perception of organic changes that at times may be intense. These organic changes are normally characterized by an increase in physiological arousal, especially of the somatic and autonomous nervous systems, although the immune system and the endocrine system may also be affected. Emotion is also revealed in facial changes, as well as other observable motor behaviors, such as voice, posture, or movement (Cano-Vindel, 1995, 1997).

The possibility of an emotional component in bronchial asthma has generated great interest in researchers and clinicians. Nowadays, there is considerable evidence that reveals that, on the average, asthma patients express more negative emotion than do healthy subjects (Lehrer, Isemberg, & Hochron, 1993; Fernández, 2012). On the other hand, we are still unaware of the direction of the emotion because it may be either the result of suffering from asthma or, on the contrary, these individuals may suffer from asthma because they experience higher levels of negative emotion (Creer, 1993).

In the field of psychophysiological disorders, anxiety has no doubt received the most attention. Spielberger (1966, 1972, 1976) differentiated conceptually and operationally trait anxiety (relatively stable individual differences in the disposition to perceive situational stimuli as dangerous or threatening and the tendency to react to them with anxiety states) and state anxiety (temporary emotional state that varies in intensity and fluctuates over time, a subjective condition characterized by conscious perception of feelings of tension and apprehension and high arousal of the autonomous nervous system).

Anxiety can affect bronchial asthma by means of two mechanisms (Vázquez & Buceta, 1990). The first is via hyperventilation and is highly related to the behaviors that accompany any intense emotional state, such as crying, laughing, etc. (Kotses & Creer, 2010). The second mechanism, responsible for the bronchoconstriction response, is caused by changes in the autonomous nervous system that occur in any emotional response. The asthma patient's cognitive activity is huge because of the intermittence of the illness and the multitude of stimuli that can provoke a crisis. Thus, the asthma patient is very much aware of environmental stimuli and generates many beliefs and expectations about the occurrence of a crisis. This causes chronic anxiety in the individual, with subsequent physiological arousal.

Besides altering the patient's pulmonary function, anxiety can also affect medical judgements and response to treatment, in sum, the evolution of the illness itself. The important studies developed in the seventies by the research team from the University of Denver follow this trend (Kinsman *et al.*, 1982). These authors obtained a personality profile of the different ways asthmatic individuals deal with anxiety. They observed that patients with high and low levels of anxiety about their illness had a more maladaptive profile, requiring more anti-asthma treatment (basically, corticoids) and longer and more frequent hospitalization.

These studies were carried on in the eighties (Brooks *et al.*, 1982; Steiner, Higgs, Fritz, Laszlo, & Harvey, 1987). In Spain, the maladaptive nature of high and low anxiety levels has also been pointed out as a variable of patients' personality (Belloch *et al.*, 1994; Pascual, 1995; Martínez *et al.*, 2002).

Ley (1989, 1991) posited a theory about what is called *dyspneic-fear*, according to which, the fear experienced during a panic attack may be directly responsible for dyspnea-induced hyperventilation, with cognitive factors playing an important role in the origin of dyspnea. Porzelius, Vest, and Nochomovitz (1992) found that 37% of patients with chronic obstructive illness experienced panic attacks. Patients who had suffered panic attacks were not different from those who had not, as a function of the severity of their respiratory illness, but the former had more agoraphobic cognitions and greater fear of body sensations. Carr, Lehrer, Rausch, and Hochron (1994), and Carr, Lehrer, Hochron, and Jackson (1996) extended the validity of Porzelius *et al.*'s cognitive model of panic disorder to include individuals with pulmonary illness.

In the revision of Thoren and Peterman (2000) three ways of dealing with the interdependence of anxiety and asthma are proposed: Anxiety related to symptoms, to asthma triggers and anxiety related to medical treatment.

Weiser (2007) made a meta-analytic review of data from 15 independent studies of the co-occurrence of adults asthma and anxiety disorders and was conducted to provide more precise comorbidity estimates. The prevalence of panic attacks, panic disorders, agoraphobia and generalized anxiety disorder were considerably higher among adults with asthma than in the general population. The estimations of prevalence of specific phobia, social phobia and posttraumatic stress disorder were comparable to or lower than rates observed in the general population. Attention to disorders appears to be highly prevalent among people with asthma and may be associated with increased asthma morbidity.

The relationship between individuals' daily emotions and alterations of pulmonary function has been examined from a correlational perspective. It has been suggested in these studies that anxiety or any other emotion, along with the high arousal level triggered by the emotion, may be responsible for the changes in pulmonary function. Thus, asthma patients present an emotional complex that could be considered dysfunctional (Fernández, 1997; Cano-Vindel & Fernández, 1999).

All these studies highlight the temporal relation between illness and emotion (Fernández, 2012). At least two issues are prominent in the analysis of the research: First, the existence of response specificity in reactivity, at the stimulus level as well as at the response level (with asthma patients and healthy subjects showing different degrees of pulmonary alteration), especially if the stimuli are illness-relevant. Second, it has been pointed out that a certain subgroup of asthma patients responds to stress with broncho-constriction. This subgroup includes about 50% of all asthma patients. The characteristics of this subgroup of reactors have not yet been established.

Anger has stimulated a growing interest among researchers in the last few years. It has been shown to be very useful for explaining some psychophysiological disorders, such as peptic ulcer and cardiovascular disorders (Hogan & Linden, 2004; Julkenen & Ahlsröm, 2006).

Spielberger, Jacobs, Russell, and Crane (1983) established a classical distinction between the concepts of anger, hostility, and aggression. Anger refers to an emotional state characterized by feelings of annoyance or irritation of varying intensity. Hostility refers to a persistent attitude of negative evaluation of other people. Aggression is considered behavior meant to cause harm to people or objects. Anger and hostility involve feelings, whereas aggression goes beyond feelings, involving behaviors, although the three concepts constantly merge. Hostility usually implies angry feelings, and, in turn, involves attitudes that trigger aggressive behavior. Similarly, among the ways of expressing anger are aggressive behaviors, both verbal and physical, towards one's milieu.

As with anxiety, trait anger can be differentiated from state anger. State anger is the emotional state or condition that includes subjective feelings of tension, irritation, annoyance, fury, or rage, with concomitant arousal of the autonomous nervous system. Trait anger is the tendency to react with a state of anger (Spielberger, Krasner, & Solomon, 1988; Deffenbacher, 1992; Izard, 1993).

Similarly to anxiety, the possible influence of this emotion on illness may be due to the increase in the arousal of the autonomous nervous system. Anger is a unique emotion with regard to mobilizing and maintaining high energy levels. In fact, other emotions cannot equal anger in maintaining high levels of motor activity (Izard, 1993).

Research on anger is not as extensive and, therefore, perhaps not as rewarding as in the case of anxiety. Most studies refer to anger-related concepts, such as hostility or aggressiveness, or to anger when studying suggestion or arousal.

Mathé and Knapp (1971) found less expression of anger in a sample of asthmatic university students compared with nonasthmatic university students, using a variant of the Mood Adjective CheckList. Tal and Miklich (1976), with a sample of 60 adolescents suffering from severe asthma, found 23 reactors when they requested subjects to listen to nine audiotapes, including 3 anger-inducing ones. Viney and Westbrook (1985) analyzed the content of interviews carried out with asthmatic and nonasthmatic children, finding more expression of hostility, both direct and indirect, in the asthma patients. Silverglade, Tosi, Wise, and D'Costa (1994) compared 129 asthma patients, ages between 12 and 18 years old, divided into three groups (slight, moderate, and severe asthma) with 74 healthy individuals, finding a higher rate of hostility in the asthma patients, which was highly associated with the severity of their asthma. Cano-Vindel and Fernández (1999), and Fernández (2012) compared a group of asthma patients with a group of healthy subjects, obtaining higher levels of anger (trait, angry temperament, anger-out, and anger expression) in the asthma patients.

The aim of this investigation was to verify and study the differences between individuals suffering from bronchial asthma and healthy individuals in anger and anxiety. For this purpose, we used two measures: one of anger (STAXI) and one of anxiety (ISRA). These instruments have been shown to be very useful to detect differential characteristics in the fields of psychophysiological disorders (Hogan & Linden, 2004) or anxiety disorders (Miguel-Tobal & Cano-Vindel, 1995; Fernández, 2012).

## Methodology

One hundred and thirty-seven subjects participated in the current research: 65 in the group of asthmatic patients and 72 in the control group of healthy subjects. All the subjects were volunteers and none were paid for their participation.

The asthma patients were recruited from the outpatient service of the Pneumology II Service of the National Institute of Silicosis (Servicio de Neumología II del Instituto Nacional de Silicosis) from the Central Hospital of Asturias (Oviedo, Spain). The control subjects, included after a personal interview, came from various milieus (neighbors' associations, residences, etc.) and this group was conformed as the group of asthma patients was completed. We were particularly careful to match the two groups for age and gender.

The groups were distributed as follows:

- *Asthma group*: 65 subjects, ages between 17 and 68 years, mean age 38 years. Of this group, 30 were men (46.2 %), mean age 40.6 years, and 35 were women (53.8 %), mean age 35.4 years. Fifteen individuals from this group were diagnosed as suffering from severe asthma, 40 from moderate asthma, and 10 from slight asthma, according to the criteria established by the Spanish Society of Pneumology and Thorax Surgery (SEPAR, 2012). A specialized physician made the diagnosis in all cases.

- *Control group*: 72 subjects, ages between 18 and 74 years, mean age 37.9 years. This group was made up of 29 men (44%) and 37 women (56%), mean ages 40.1 and 35.7 years, respectively.

In order to study anxiety, we chose the short version of the *Inventory of Situations and Responses of Anxiety* (*Inventario de Situaciones y Respuestas de Ansiedad*, ISRA; Miguel-Tobal & Cano-Vindel, 1986, 1988, 1994; Spielberger & Miguel-Tobal, 2001). This inventory assesses the frequency with which a person manifests a number of cognitive responses (thoughts and feelings of worry, fear, apprehension, insecurity, etc.), physiological responses (various arousal indexes of autonomous and somatic nervous system), and motor responses (signs of motor agitation) when dealing with various situations (evaluation situations, interpersonal-

al situations, phobic situations, and daily life situations). As well as the indexes in the three response systems and the four situational areas, the *ISRA* also provides a measure of trait anxiety.

We employed the Spanish experimental version of the *STAXI*, adapted by Spielberg, Miguel-Tobal, Cano-Vindel, and Casado (1992). The authors of this version respected the format of the original version (Spielberger, 1988, 1991) and attempted to maintain the original meaning of each item, adapting them to Spanish expressions. It is made up of 44 items.

The *STAXI* inventory is made up of three parts or scales, with specific instructions corresponding to measures of state anger (intensity of angry feelings at a certain time), trait anger (disposition to feel anger), and anger expression. The trait anger scale provides two additional subscales: Angry temperament (tendency to experience anger without specific provocation) and angry reaction (tendency to experience anger when criticized or treated unfairly). The anger expression scale also provides four subscales: Anger-in (frequency with which angry feelings are suppressed or curbed), anger-out (frequency with which a person expresses angry feelings towards other people or objects), anger control (frequency with which an individual attempts to control anger expression), and anger expression (general index of anger expression, either anger-in or anger-out).

Assessment was carried out individually in all cases and was voluntary. The inventories were filled in after interviewing each subject to insure the inclusion criteria of the subject to one of the groups. During the interview, subjects were informed about the nature of the study. Asthma patients were contacted at the hospital outpatient service and they were assessed after seeing the doctor.

In order to be included in the bronchial asthma group, subjects had to meet the following requirements:

- They had to be diagnosed as suffering from bronchial asthma by a specialized physician.
- They did not suffer from any other psychophysiological or psychological disorder.

The requirements for the control group were to not suffer or have suffered from bronchial asthma or any other psychophysiological disorder, or any psychological disorder.

After the assessment phase, the scores of each scale were analyzed. Means and standard deviations for each group were calculated. We performed Student's *t*-test (difference between means for equal or different variances) in order to analyze the differences between the group means and the level of statistical significance for each sample. We also performed an analysis of variance to see whether there were statistical differences between asthma patients as a function of gender. Data analysis was carried out with the SPSS statistical package for Windows.

## Results

The results for anxiety (table 1) revealed highly significant differences in all the anxiety scales ( $p < .001$ ), except for interpersonal anxiety, where statistical significance was at the level ( $p = .005$ ). In all cases, the asthma patients had higher scores. In the case of anger (table 2), statistically significant differences were found in the trait anger scales ( $p = .002$ ), angry temperament or irritability ( $p = .001$ ), anger-out ( $p = .007$ ), and anger expression ( $p = .007$ ). The asthma patients also had higher scores in anger.

TABLE 1. MEANS, STANDARD DEVIATIONS, T-TEST AND SIGNIFICANCE LEVELS BETWEEN ASTHMATICS AND CONTROL GROUP IN ISRA.

Variable	Asthma		Control		t-test	Significance Level
	Mean	SD	Mean	SD		
Cognitive Anxiety	15.00	5.08	9.60	6.12	3.91	<.001
Physiological Anxiety	15.43	6.44	6.31	4.88	6.56	<.001
Motor Anxiety	11.12	4.16	7.28	3.65	4.02	<.001
Trait Anxiety	41.55	13.10	23.19	11.98	5.99	<.001
Tests Anxiety	14.87	4.74	9.48	3.88	5.11	<.001
Interpersonal Anxiety	4.06	2.36	2.54	1.91	2.90	.005
Phobic Anxiety	6.71	3.05	4.08	2.82	3.67	<.001
Day Life Anxiety	3.96	2.30	1.31	1.34	5.69	<.001

TABLE 2. MEANS, STANDARD DEVIATIONS, T-TEST AND SIGNIFICANCE LEVELS BETWEEN ASTHMATICS AND CONTROL GROUP IN STAXI.

Variable	Asthma		Control		t-test	Significance Level
	Mean	SD	Mean	SD		
State Anger	10.93	1.90	11.93	4.36	-0.59	.559
Trait Anger	20.34	6.28	6.28	3.31	3.36	.002
Angry Temperament	7.25	2.70	5.42	1.48	3.46	.001
Angry Reaction	9.46	3.27	8.30	2.37	1.66	.103
Anger In	16.59	3.80	15.05	3.40	1.75	.086
Anger Out	16.59	4.95	13.69	3.57	2.79	.007
Anger Control	20.75	4.75	22.28	5.81	-1.18	.244
Anger Expression	28.43	9.01	22.60	8.25	2.77	.007

The analysis of variance to explore differences in anxiety in the asthmatic patients as a function of gender only revealed statistically significant differences



in F-IV or daily life anxiety,  $F(1, 63) = 4.245$ ,  $p = .043$ , with men having higher anxiety scores than women (table 3).

With regard to anger, the analysis of variance revealed statistically significant differences in state anger,  $F(1, 63) = 4.983$ ,  $p = .029$ ; trait anger,  $F(1, 63) = 16.092$ ,  $p < .001$ ; angry temperament,  $F(1, 63) = 9.277$ ,  $p = .003$ ; angry reaction,  $F(1, 63) = 9.338$ ,  $p = .003$ ; anger-out,  $F(1, 63) = 8.785$ ,  $p = .004$ , and, lastly, anger expression,  $F(1, 63) = 5.095$ ,  $p = .027$ . In all cases, men obtained higher mean scores than women (table 4).

TABLE 3. *F* AND *P*-VALUES OF ISRA ANOVA.

Variable	<i>F</i>	<i>p</i>
Cognitive Anxiety	2.743	.103
Physiological Anxiety	0.512	.477
Motor Anxiety	0.993	.322
Trait Anxiety	1.699	.197
Tests Anxiety	0.093	.761
Interpersonal Anxiety	1.051	.309
Phobic Anxiety	1.924	.170
Day Life Anxiety	4.245	.043

TABLE 4. *F* AND *P*-VALUES OF STAXI ANOVA.

Variable	<i>F</i>	<i>p</i>
State Anger	4.983	.029
Trait Anger	16.092	<.001
Angry Temperament	9.277	.003
Angry Reaction	9.338	.003
Anger In	1.427	.237
Anger Out	8.785	.004
Anger Control	0.076	.784
Anger Expression	5.095	.027

## Discussion

The data obtained show that anxiety and anger are involved in the asthmatic patient's profile. As regards anger, asthma patients are different from control subjects, especially in their general tendency to experience and express anger without specific provocation (or angry temperament), in anger-out (or degree to which an individual expresses anger towards other people and objects). The asthma patients were also different in trait anger and the frequency with which they express anger.

Within the asthmatic group, men had higher levels of state anger, trait anger, angry temperament, and angry reaction, expressing anger more often, directed towards other people or objects (Anger-Out).

In anger, the data obtained are in accordance with other research that reported higher levels of negative emotion in asthma patients, and with previous studies about this emotion (Cano-Vindel & Fernández, 1999; Fernández, 2012). In this study, new data about the characteristics of anger in asthma patients is revealed. The presence of anger in cardiovascular disorders (Hogan & Linden, 2004; Julkenen & Ahlsröm, 2006) or in gastric ulcer (Sharma, Ghosh, & Spielberger, 1995) has already been shown. Now, more research should be carried out in bronchial asthma with this variable, to clarify its effects on the illness and to establish therapeutic strategies if necessary, as the first data seem to imply.

Asthma patients not only had higher anxiety scores than control subjects in trait anxiety, but also had more thoughts of insecurity, showed more arousal of the autonomous and somatic nervous systems, showed more motor behaviors, as well as higher levels of anxiety in the four situational factors assessed. Among the asthma patients, men presented higher levels of anxiety in daily life situations (F-IV), such as work, studies, bedtime, or because of nothing special.

Traditionally, when referring to anxiety, only data about trait anxiety have been reported. As mentioned, methods that provide results in the three response systems are rarely offered in psychology, usually requiring multiple measures. The current study represents an advance and offers, on the one hand, broader indexes regarding the information from the three response systems, and on the other hand, concerning situational factors.

These data lend support to the crucial influence of anxiety in psychophysiological disorders. In fact, anxiety is one of the explanatory factors of these disorders (Pelechano, 2008). The significant role of anxiety in asthma, in adults as well as in children and adolescents, has already been emphasized. Pitifully we cannot obtain the relation of the direction between illness and emotion.

In order to carry out a correct and complete treatment of the illness, it is essential to take into account the presence of an emotional component in bronchial asthma. Because of these emotional variables, psychological intervention strategies are also necessary (Vázquez & Buceta, 1996), and should be included not only with adult patients, but also with children and adolescents.

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